

CLAIMS

What is claimed is:

1. A method, comprising:
broadcasting a message at a repeater to one or more members in a network including a switch, the broadcasted message indicating that the repeater is entering the network;
receiving VLAN (virtual local area network) configuration information from the switch in response to the broadcast message; and
communicating with the switch using the VLAN configuration information in subsequent communications.
2. The method of claim 1, wherein the VLAN configuration information includes a VLAN ID for each traffic criteria.
3. The method of claim 1, further comprising downloading operating software from the switch to enable the repeater to operate.
4. A method, comprising:
receiving at a switch a broadcast message from a repeater, the broadcasted message indicating that the repeater is entering the network;
transmitting VLAN (virtual local area network) configuration information to the repeater in response to the broadcast message; and
communicating with the repeater using the VLAN configuration information in subsequent communications.

5. The method of claim 4, wherein the VLAN configuration information includes a VLAN ID for each traffic criteria.
6. The method of claim 4, further comprising downloading operating software to the repeater to enable the repeater to operate.
7. A method, comprising:
 - receiving at a repeater messages broadcasted over a network;
 - identifying at least one message that is associated with a switch, the message associated with the switch including a VLAN ID identifying the switch; and
 - establishing a connection with the switch using the VLAN ID.
8. The method of claim 7, further comprising:
 - receiving VLAN configuration information from the switch, the VLAN configuration information including a VLAN ID identifying each traffic criteria; and
 - downloading operating software from the switch to enable the repeater to operate.
9. A method, comprising:
 - periodically transmitting, at a switch, a heartbeat message to a network having one or more repeaters, the heartbeat message including a VLAN ID identifying the switch; and
 - in response to a response from a repeater, transmitting VLAN configuration information to the repeater, the VLAN configuration information including a VLAN ID identifying each traffic criteria.

10. The method of claim 9, further comprising downloading operating software to the repeater to enable the repeater to operate.
11. A method, comprising:
downloading, at a repeater, operating software from a switch, the downloaded software
being used to operate the repeater communicatively coupled to the switch;
executing the downloaded software to launch an operating environment within the
repeater; and
transmitting a message to the switch indicating that the repeater is ready for further
communications after the operating environment has been launched.
12. The method of claim 11, further comprising operating according to an operating mode
in response to a request from the switch.
13. The method of claim 11, wherein executing the downloaded software comprises
loading the downloaded software in a memory of the repeater at a location specified by the
downloading operations.
14. The method of claim 11, further comprising:
determining there is an error or timeout during the downloading; and
discarding the software already downloaded if it is determined there is an error or
timeout.
15. A method, comprising:
receiving, at a switch, a message from a repeater indicating that the repeater is ready to
download operating software;

in response to the message, downloading the operating software to the repeater, the downloaded software including information where in a memory of the repeater the software is executed; and causing the repeater to execute the downloaded software at a specified memory location of the repeater.

16. The method of claim 15, further comprising instructing the repeater to enter an operating mode in response to a message received from the repeater indicating that the operating environment has been launched.

17. A method, comprising:
receiving, at a repeater, a message from a mobile station indicating that the mobile station enters into a network associated with the repeater;
forwarding the message to a switch communicatively coupled to the repeater;
receiving a token assigned from the switch, the token indicating the repeater is a primary repeater associated with the mobile station; and
automatically responding to the mobile station as long as the repeater possesses the assigned token.

18. The method of claim 17, further comprising transmitting a message to the switch including RSSI (received signal strength indicator) information with respect to the mobile station, wherein the token is assigned by the switch based in part on the RSSI of the respective repeater.

19. A method, comprising:

receiving, at a switch, one or more messages from one or more repeater communicatively coupled to the switch, the one or more messages indicating that a mobile station is requesting entering a network associated with the switch and the one or more repeaters;
selecting a repeater from the one or more repeaters as a primary repeater associated with the mobile station based on one or more policies; and
assigning a token to the selected repeater to allow the selected repeater to respond to the mobile station.

20. The method of claim 19, further comprising receiving a message from the one or more repeaters including RSSI (received signal strength indicator) information with respect to the mobile station, wherein the token is assigned by the switch based in part on the RSSI of the respective repeater.

21. A method, comprising:
receiving, at a switch, a message transmitted from a mobile station and relayed by one or more repeaters indicating that the mobile station is losing a connection or a poor quality connection with an original repeater;
determining a new repeater to replace the original repeater based on RSSI information of each repeater; and
performing a token handoff process that removes a token from the original repeater and assigns the token to the new repeater to allow the new repeater to communicate with the mobile station as a primary repeater.

22. The method of claim 21, wherein the message transmitted from the mobile station includes at least one of a retry, probe request, and RTS (request to send) messages.

23. A method, comprising:
- periodically receiving, at a switch, RSSI information from each of one or more repeaters communicatively coupled to the switch, including a primary repeater associated with a mobile station, the primary repeater having a token indicating that an owner of the token is a primary repeater;
- determining whether the RSSI of the primary repeater drops below a predetermined threshold; and
- performing a token handoff process that removes a token from the primary repeater and assigns the token to the new repeater to allow the new repeater to communicate with the mobile station as a new primary repeater.
24. The method of claim 23, wherein the RSSI information is transmitted from each of the repeaters to the switch as a part of the respective receiving data message of the mobile station.
25. The method of claim 23, further comprising having the switch to periodically monitor the RSSI information of each repeater, wherein the new repeater has the highest RSSI among the one or more repeaters.
26. A method, comprising:
- determining at a repeater that a connection between the repeater and a switch is down, based on at least one of a heartbeat, beacon, and/or data messages received from the switch; and
- in response to the determination, performing a reset process within the repeater that enable the repeater reestablish a new connection with the switch.
27. The method of claim 26, wherein the reset process comprises:

broadcasting a message at the repeater to the switch, the broadcasted message
indicating that the repeater is entering the network;
receiving VLAN (virtual local area network) configuration information from the
switch;
downloading operating software from the switch to launch an operating environment
of the repeater; and
communicating with the switch using the VLAN configuration information in
subsequent communications.

28. The method of claim 26, wherein the reset process comprises:
listening at the repeater all messages broadcasted over a network;
identifying at least one message that is associated with the switch, the message
associated with the switch including a VLAN ID identifying the switch; and
establishing a connection with the switch using the VLAN ID.
29. A method, comprising:
determining, at a switch based on heartbeat messages or other responses received from
a first repeater, that a connection between the switch and the first repeater is
down;
in response to the determination, determining, after a predetermined period of time,
whether there is still at least one mobile station associated with the first
repeater; and
reassociating the at least one mobile station with a second repeater if there is still at
least one mobile station associated with the first repeater.

30. The method of claim 29, wherein reassociating the at least one mobile station comprises performing a token handoff process from the first repeater to the second repeater to allow the second repeater communicate with the mobile station as a primary repeater.
31. A method, comprising:
periodically transmitting a beacon message from a switch to each of one or more repeaters communicatively coupled to the switch, the beacon message including a time stamp associated with the switch; and
synchronizing the switch with the one or more repeaters using the beacon message.
32. The method of claim 31, wherein the beacon message is time stamped by the respective repeater before transmitting to one or more mobile stations associated with the respective repeater to synchronize the mobile stations.
33. The method of claim 31, wherein the beacon message transmitted to each repeater respectively is separated by a predetermined period of time to avoid collisions.
34. A method, comprising:
receiving, at a repeater, a beacon message from a switch, the beacon message including a time stamp associated with the switch;
broadcasting the beacon message to one or more mobile stations, the broadcasted beacon message including an update with time difference between receiving and transmitting the beacon message by the repeater, in addition to the time stamp associated with the switch.
35. The method of claim 34, further comprising:

performing a first time stamp when the beacon message is received by the repeater;
performing a second time stamp when the beacon message is about to be transmitted
to the one or more mobile stations; and
determining the time difference based on the first and second time stamps.

36. A method, comprising:

receiving, at a switch, a data packet destined to a recipient;
dividing a payload of the data packet into a plurality of data fragments; and
sequentially transmitting the separate packets via a communication protocol to the
recipient, wherein the recipient reassembles the plurality of data fragments to
recover the payload of the data packet.

37. The method of claim 36, further comprising encapsulating each data fragment into a
separate packet conforming to the communication protocol.

38. The method of claim 36, further comprising indicating within the each data fragment
whether the respective data fragment is a first, a continued, or a last data fragment.

39. A method, comprising:

sequentially receiving a plurality of packets from a switch, each packet including a
data fragment of a payload of data;
extracting the data fragment from the packet and storing the extracted data fragment in
a memory until no more data fragments that have not been received with
respect to the payload of data;
reassembles the extracted data fragments to recover the payload; and
processing the recovered payload as a whole.

40. The method of claim 39, wherein each packet includes an indication whether the respective data fragment contained within the packet is a first, a continued, or a last data fragment.